

CLASSIFICATION OF LOW BACK PAIN

Hazel Jenkins B.Med.Sci., M.Chiro. *

INTRODUCTION

Low back pain is one of the leading causes of health problems in the developed world. The yearly prevalence of low back pain varies from 5% to as high as 65%¹⁻⁵ the lifetime prevalence can range up to 84%^{2,4,5} and the monthly prevalence has been placed between 35% and 37%⁶. Low back pain has a high rate of disability associated with it, which has led to an escalation in the medical based costs as a result of low back pain². Many people have their first episode of low back pain in their late teens or early twenties and these episodes frequently reoccur throughout adult life leading to a chronic condition⁷. It is these chronic conditions, with their resultant psychosocial components, that lead to the greatest medical based costs². Therefore, it becomes imperative that correct diagnosis of low back pain be made as early as possible, with the best treatment applied, to prevent initial acute episodes from becoming a chronic reoccurrence.

DIAGNOSIS OF LOW BACK PAIN

Low back pain is a complex symptom with many diverse causes for its presentation. There is no other part in the body that contains so many potentially pain causing structures⁸ in such a small area. This makes forming a precise diagnosis as to the tissue causing the low back pain very challenging. The formation of a medical diagnosis is imperative to enable the clinician to arrive at a suitable treatment for the pain⁸. In 90% of low back pain cases, however, there is an underlying mechanical cause to the low back pain⁹ that will resolve itself within two to eight weeks^{4,10,11} with minimal treatment. From this it can be concluded that in a majority of cases knowledge of a definitive tissue in lesion will not dramatically effect a patient's long-term prognosis. The more important issue in the diagnosis of low back pain is differentiating these benign mechanical causes of low back pain from the more serious and pathological causes that do require immediate treatment^{10,12}. This particularly becomes an important consideration for manual therapists who specifically treat the mechanical causes of low back pain.

A number of classification systems for low back pain have been postulated that focus more on the level of pathology and less on the specific structures involved^{4,8,12}. Although the precise categories and the methods of determination

differ between these classification systems there is an underlying distinction of four clinical patterns: simple mechanical low back pain; low back pain with radiculopathy; serious pathological low back pain; and low back pain with a psychological overlay.

These 4 categories distinguish the level of treatment each patient needs. Simple mechanical low back pain can be treated and is amenable to conservative care. Low back pain with radiculopathy can be treated with conservative care but increased ongoing assessment is required to ensure that the treatment is effective and symptoms are not progressing. Serious pathological low back pain requires further investigation before any treatment is administered and immediate referral for medical evaluation is necessary. Finally, low back pain with a psychological overlay requires concurrent conservative chiropractic care and psychological assessment.

We will therefore consider an algorithmic approach to diagnosis between these categories to facilitate the evaluation of low back pain. We will then look at specific disease entities within each category and how these may be diagnosed.

ALGORITHMIC CATEGORISATION OF LOW BACK PAIN

Algorithms provide an excellent screening tool for general categorisation. Although their use has been criticised as too limited in a definitive diagnosis of low back pain¹³, they can be used effectively to screen a patient for their general category of low back pain presentation. Furthermore, algorithms provide an easily reproducible and time effective method of ensuring that no potentially serious signs and symptoms are missed. The therapist should be encouraged to implement an algorithmic approach to the categorisation of low back pain such as the one that will be presented here. This will provide primary care practitioners with a reliable method of ensuring that their patients receive the most appropriate care.

The algorithm (see Figure 1) consists of several key questions that can be screened in the history to categorise each patient. Relevant physical examination findings are then used to confirm that categorisation.

SIMPLE MECHANICAL LOW BACK PAIN

A condition that falls into the simple mechanical low back pain category is particularly amenable to conservative care. This category contains many benign conditions of the low back, which are self-resolving within 2-8 weeks^{4,10,11}. The main goal of treatment is to decrease the

* Printing Requests and Correspondence

Hazel Jenkins
18 Manor Road
HORNSBY, NSW. 2077. Australia.
Email: hjenk001@hotmail.com

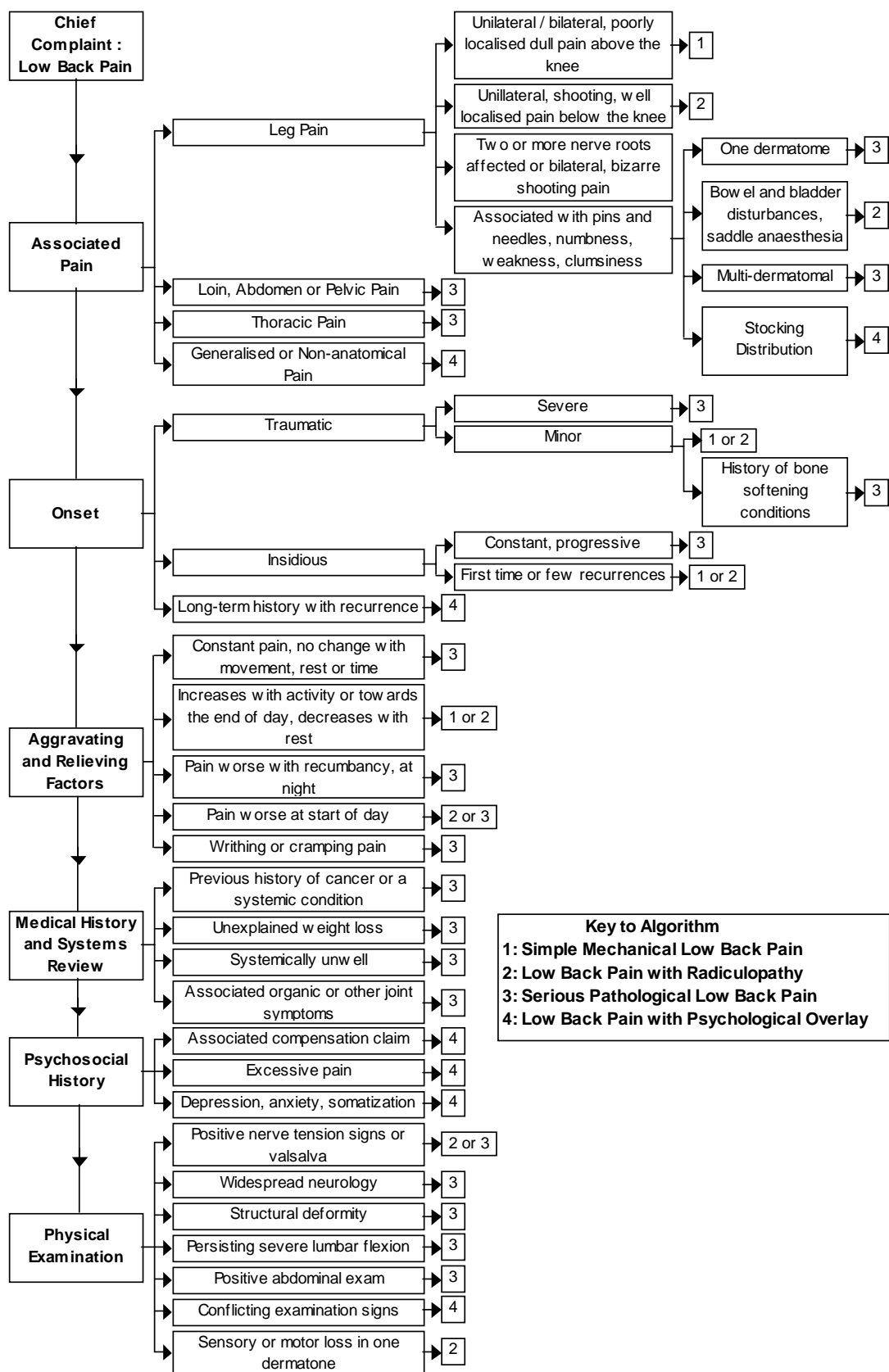


Figure 1 : An algorithmic approach to the categorization of low back pain to direct chiropractic treatment

length of disability time and to prevent chronicity and associated psychological overlay. There are many different causes of simple mechanical low back pain and it is not always possible to differentiate the exact tissue causing the pain. However, some of the more common low back pain syndromes are presented below.

Facet Syndrome

Facet syndrome may be the primary cause of low back pain in as many as 15% to 20% of cases¹³. The pain is caused by pinching of the synovial folds within the joint itself⁴. This pain tends to be increased by extension and homolateral lateral flexion or rotation movements^{4,13} where compression within the facet joint is increased. In particular the lumbar Kemp's manoeuvre specifically reproduces the pain⁴. The pain is usually described as a lateral sharp or catchy, localised low back pain^{4,13} possibly with some deep, dull, ill-defined sclerotomal pain extending to the posterior buttocks and thigh^{4,8,13}. The pain is usually decreased by distraction of the spine¹³ and there is an absence of neurological deficits and nerve root tension signs^{4,8}.

Sacroiliac Joint Syndrome

A sprain of the anterior or posterior sacroiliac joint ligaments is a frequently overlooked source of low back pain^{4,13}. The pain itself presents similarly to that of facet syndrome. However, the sharp low back pain is localised to the sacroiliac joint and the referred pain may extend posteriorly down the thigh or anteriorly to the groin region^{8,13}. Once again no neurological deficits or nerve tension signs will be found on examination⁸. The pain will be typically made worse on walking¹³ and relieved by sitting or lying⁴. On examination pain should be reproduced on the Patrick Fabere test, on prone sacral springing and on one other provocative manoeuvre such as Gaenslens or Yeomans¹⁴. However, even with these tests, a definitive diagnosis may not be possible^{13,14} and may explain the low occurrence of this syndrome in the literature⁴.

Myofascial Pain Syndromes and Lumbar Muscle Sprain/Strain

Myofascial pain syndromes occur when the muscle spasms and a trigger point forms. This trigger point, when active, is locally tender and can refer pain in a characteristic pattern for that muscle⁸. This referred pain may spread down the front or back of the leg, possibly to below the knee⁸. Muscles that may be involved include quadratus lumborum, gluteus maximus, gluteus medius, piriformis, and the hamstrings^{4,8}. The pain is commonly aggravated by either stretch or contraction of the muscle, and no neurological deficits or nerve tension signs are present. Lumbar muscle sprain/strain may be caused by sudden movement or overuse¹³. Pain is made worse by movements that contract or stretch the muscle, and is relieved by rest¹³. Pain from a sprain/strain tends to be vague, achy

and diffuse and there may be associated referral to the posterior thigh and buttock¹³. The muscle often spasms after injury, and hence, trigger point formation may occur, leading to a future myofascial pain syndrome.

Spondylolysis and Spondylolisthesis

Spondylolysis refers to a fatigue fracture of the pars interarticularis¹⁵ whereas spondylolisthesis refer to a forward slippage of one vertebra upon the one below it¹⁶. Spondylolytic spondylolisthesis is most common at L₅ in adolescent athletes, particularly in those who in engage in repetitive extension type activities^{4,15}. Non-spondylolytic spondylolisthesis, on the other hand, is more common at L₄ in older people due to a degenerative elongation of the pars interarticularis⁸. The most common symptom is that of local low back pain aggravated by extension or activity, and relieved by rest^{4,13,15,16}. However, it is also possible to have radicular signs of nerve entrapment, or signs of central stenosis due to the forward slippage^{4,8} or for the patient to be asymptomatic^{4,16}. Therefore, spondylolisthesis may form part of a more serious clinical picture and radiological evaluation is required to monitor the forward slippage of the vertebra⁴.

LOW BACK PAIN WITH RADICULOPATHY

Low back pain with radiculopathy is a potentially more serious form of mechanical low back pain. It can still be effectively managed with conservative care but frequent reassessments are required to ensure that improvements are occurring with treatment and that symptoms are not worsening. The main causes of low back pain with radiculopathy are lumbar disc herniations and lumbar spinal stenosis. Both of these conditions directly affect the nerve root as it exits through the intervertebral foramen. The nerve root is either irritated, causing shooting pain and paraesthesias, or is compressed, causing sensory and motor loss in its distribution.

Lumbar Disc Herniation

Lumbar disc herniation occurs when the nucleus pulposus herniates through the annulus fibrosus, leading to irritation or compression of the spinal nerve^{8,13,16}. This most frequently occurs in the third to fifth decades of life¹⁶ and there is often a past history of recurrent low back pain^{4,8}. Furthermore, the patient frequently recounts a sudden onset due to a bending, twisting or lifting manoeuvre⁴. The most frequent levels affected are those of L₄₋₅ and L_{5-S₁}, seen in up to 98% of cases^{4,16}. Therefore, pain and sensory changes will most likely follow the L₅ or S₁ dermatomes to the leg and foot. The patient complains of low back pain and leg pain, which is frequently made worse by forward flexion or prolonged sitting and relieved by standing or lying¹³. On examination the most sensitive tests have been found to be a decreased range of movement in flexion and nerve tension signs on the straight and well leg raise tests^{4,17}. Other signs to look for

are a positive valsalva sign, decreased reflexes, weakness of specific myotomal muscles, numbness in a dermatomal distribution and an antalgic gait^{4,16,17}.

Lumbar Spinal Stenosis

Lumbar spinal stenosis is caused by a narrowing of the spinal canal by either osseous or soft tissue encroachment⁴. This is more frequent in older patients due to spinal degeneration¹³. Patients frequently have a past history of recurrent low back pain¹⁸. They also tend to have multi-level stenosis, especially when diffuse leg pain is the main complaint⁴. Symptoms may resemble those of a radiculopathy due to nerve root compression or they may be due to neurogenic claudication¹⁸. The pain tends to increase when the lumbar spine is extended or when walking and is relieved by forward flexion or sitting^{4,13,16,18}. Although they may experience radiculopathy, the pain is generally described as a poorly localised, cramping pain with paraesthesias and heaviness in the legs^{4,13,16,18}. Diagnosis can be difficult as neurologic signs are frequently only present while walking, so it can be helpful to ask the patient to take a short walk before the examination¹⁶. When present, signs include a positive straight leg raise test, decreased reflexes and sensory or motor loss.

To aid differentiation from vascular claudication, which may present with similar symptoms but is not relieved by flexion, a two-stage treadmill test has been proposed⁵⁰. This test incorporates walking on a flat treadmill and walking up an inclined treadmill. When walking uphill the patient is forced to flex and symptoms associated with neurogenic claudication may disappear whereas those associated with vascular claudication will remain.

SERIOUS PATHOLOGICAL LOW BACK PAIN

Patients whose signs and symptoms fall into the serious pathological low back pain category require immediate further investigation. This may include radiological assessment via x-ray, or referral to a medical practitioner for blood tests or further imaging such as CT, MRI, bone scans and ultrasound. In all cases, concurrent medical care is essential to achieve an optimal outcome for the patient. Through further investigation it may be decided that the patient's complaint is due to simple mechanical low back pain. However, with signs and symptoms that place the patient into this category, further investigation is warranted before such a decision can be made.

Although most of the causes of serious pathological low back pain are extremely rare (less than 1% of low back pain¹²), the potential detrimental outcome without adequate treatment means that these causes must be considered and excluded when examining a patient¹³.

Cauda Equina Syndrome

Cauda equina syndrome is the mechanical compression of the lower lumbar and sacral nerve roots as they pass through the spinal canal in the cauda equina bundle. This is most commonly due to large central disc herniation at the L₄₋₅ level¹⁶ or L₅-S₁⁸, although it may also be due to severe lumbar spinal stenosis¹⁸ or an inflammatory or neoplastic lesion⁸. Cauda equina syndrome must be eliminated from the diagnosis set as it is an acute medical emergency, and immediate decompression surgery is required to prevent permanent neurological deficit⁸.

Cauda equina syndrome presents with widespread neurological deficits including symptoms across more than one nerve root or bilaterally¹². The patient will also present with low back pain, anaesthesia, motor weakness or flaccid paraplegia and decreased reflexes¹⁶. Further important symptoms are bowel and bladder incontinence and saddle anaesthesia, which are pathognomonic of cauda equina syndrome^{8,12,16}. It must be remembered that cauda equina syndrome can occur suddenly or over a few hours or days⁸. It is also possible for this syndrome to develop insidiously in a patient under care for a radiculopathy⁸ and therefore, all patients with radiculopathy must be monitored for increasing symptoms or bowel and bladder disturbances.

Rheumatologic Diseases

Ankylosing Spondylitis occurs in approximately 1% of the caucasian population and is three times more likely to occur in males^{4,10}. It commonly presents between the ages of 20-40^{10,13} with insidious, diffuse low back pain and stiffness^{4,10,13} lasting longer than three months²⁰. Low back pain may radiate to the buttocks or anterior or posterior thigh^{4,13} and the stiffness tends to increase in the morning and decrease with activity²⁰. The stiffness gradually extends to bony ankylosis of the spine with visible changes on x-ray analysis and decreased lumbar lordosis and increased thoracic kyphosis⁴. Other examination findings include tenderness over sacroiliac joints, decreased chest expansion and reduced range of motion in all directions^{4,10,13,20}. In 50% of cases other peripheral joints may be involved⁴ and extra-articular manifestations include acute anterior uveitis, aortic insufficiency and neurological deficits associated with fracture or atlantoaxial instability²⁰.

Psoriatic Arthritis is a slowly progressive arthritis occurring in 5-7% of people with psoriasis^{10,13} and 0.1% of the general population¹⁰. The arthritis may develop before, with or after the onset of psoriasis²¹. The spine is only affected in 21% of cases with the hands being the most common joint affected¹³. Patients with psoriatic arthritis of the spine may complain of mild back stiffness and pain, particularly in the morning, and limited range of motion²¹. They may also complain of sacroiliitis and tender sacroiliac joints and show signs of psoriatic plaques, particularly on the scalp and extensor surfaces of knees

and elbows²¹. Radiographic changes will be observed in the spine and other affected joints^{10,21}.

Reiters Syndrome commonly presents with the tetrad of urethritis, conjunctivitis, polyarthritis and mucocutaneous lesions on the palms, soles, mouth or genitals^{4,10}. It is the most common arthritis in young men and affects 10 times more men than women¹⁰. The most common joints affected are the knees, ankles, feet and sacroiliac joints^{4,10}. Physical signs include tenderness over the sacroiliac joints, decreased lumbar range of motion and painful heels in addition to the other extra-articular manifestations such as pain on urination, a painful eye and skin lesions^{4,10}. Typical radiographic changes in the spine may also be observed¹⁰.

Enteropathic Arthritis presents similarly to ankylosing spondylitis but there is the added involvement of inflammatory bowel disease which may occur before, during or after the arthritis^{10,13}.

Vertebral Osteomyelitis

Vertebral osteomyelitis is an infection of the vertebra caused by bacteria, fungi, mycobacteria, spirochetes or parasites^{4,10,13}. The most common site is the vertebral body²², however, it can also occur in the posterior elements²². The spine itself is a rare site and is only affected in 2-4% of osteomyelitis cases²². However, potential side-effects are serious, including vertebral or intervertebral disc collapse and epidural abscess, which may lead to neural compromise¹³. The disease process may be acute or chronic depending on the infecting organism, but the patient frequently recounts recent history of skin, respiratory, gastrointestinal or urinary tract infection^{4,10,13,22}. Symptoms described include insidious but severe, deep low back pain, which is present at rest and increased by activity. Patients have difficulty sleeping and may or may not have a fever^{4,10,13,22}. Physical signs include antalgic positioning, muscle spasm, decreased range of motion and tenderness to palpation^{4,22}. The most reliable investigation result is an elevated erythrocyte sedimentation rate (ESR), as radiographic changes may not become apparent until later in the disease process¹³.

Neoplastic Disease

The most common signs associated with neoplastic disease include: age greater than 50, previous malignancy, recent unexplained weight loss, constant pain that is worse at night, duration of pain greater than 1 month, failure of conservative treatment, elevated ESR and anaemia^{10,13}. The presence of any of these signs must alert the practitioner to the possibility of a primary or secondary bone tumour.

Primary Bone Tumours affecting the lumbar spine include multiple myeloma and osteoid osteomas^{10,13}. Osteoid

osteoma is a benign tumour with characteristic constant, boring pain that is worse at night and dramatically relieved by aspirin^{10,13}. Also present is a scoliosis due to muscle spasm with the tumour at the concavity of the scoliosis¹⁰. This tumour tends to affect people between the ages of 20 and 30¹⁰.

Multiple myeloma is the most common malignant tumour to affect the bone in adults^{10,13}. It is rare below the age of 40 and most commonly affects people between 50 and 70^{4,10,13}. Patients complain of a mild, aching low back pain which is initially relieved by rest and aggravated by weight bearing^{10,13}. Later the pain becomes worse at night and is unrelieved by rest^{4,13}. Associated symptoms may include fever, pallor, diffuse bone tenderness and purpura¹⁰.

Secondary Bone Tumours metastasise from various sites in the body including the breast, prostate, lung and kidney. Less than 1% of low back pain is accounted for by metastases, but they are 25 times more likely to affect the spine than primary bone tumours^{4,10,13}. The presenting complaint tends to be insidious, constant low back pain that is unrelieved by rest in a patient over 50 years old^{4,13}. If the tumor extends into the spinal canal, signs and symptoms of a space occupying lesion may also occur such as positive valsalva and nerve tension tests^{10,22}. Screening tests for metastases include ESR, serum protein electrophoresis, serum calcium, alkaline phosphatase, prostate specific antigen and x-rays²³.

Abdominal Aortic Aneurysm

The most common vascular cause of acute low back pain is rupture of an abdominal aortic aneurysm¹³. These are generally asymptomatic until rupture⁴, although symptoms may arise due to compression of surrounding structures¹³. Abdominal aortic aneurysms are a degenerative condition which are more common in males greater than 50 years and those with risk factors of hypertension, smoking, and atherosclerosis²⁴. Before rupture the main finding may be that of a pulsatile abdominal mass with possible changes in the more peripheral pulses⁴. Upon rupture the patient complains of severe lumbar, groin or abdominal pain^{4,13,24} with associated signs of syncope, hypotension, shock or vascular claudication^{4,24}. The non-ruptured abdominal aortic aneurysm may be observed on x-ray analysis if it has undergone sufficient calcification^{4,13,24}.

Osteoporosis

Osteoporosis is the most common metabolic disorder to produce low back pain. It is caused by a loss of bone mass despite a normal bone mineral to matrix ratio¹⁰ and is most common in older women¹³. However, there are many potential causes of osteoporosis that may occur across any age or sex group. Low back pain from osteoporosis is caused by compression fractures of the vertebrae. The pain is severe and usually persists over 3 to 4 months as the fracture heals. Aggravating factors include prolonged

DIAGNOSTIC PROBLEM SOLVING OF LBP

JENKINS

sitting or standing and there is often a positive Valsalva sign present^{10,13}. Up to 30% of bone density needs to be lost before osteoporotic changes are apparent on plain film x-ray¹³ and bone density scans are used as a more sensitive means of diagnosing osteoporosis¹⁰.

Referred Pain

Pain can be referred to the low back from many abdominal and pelvic visceral organs. However, in most of these cases the low back pain will be associated with pelvic or abdominal pain or will follow a non-mechanical pattern such as eating or the menstrual cycle. Colicky pain or pain that causes the patient to writhe should also be considered to be due to visceral referral until proven otherwise¹³.

Kidney or Ureter Pain is felt in the flank at the costovertebral angle of T12-L1^{10,13}. This is an unusual area for mechanical low back pain as it is lateral to the paraspinal muscles¹³. Pain in this area can be caused by diseases of the kidney such as tumours²⁵ or hydronephrosis²⁶ and is usually dull and constant¹³.

Bladder Pain may present as mild, diffuse low back pain¹⁰ associated with urinary symptoms and abdominal pain¹³. Chronic cystitis may present as persistent low back pain but both tend to clear with antibiotic therapy¹⁰.

Genital Tract problems in both males and females may be complicated by low back pain. Endometriosis often presents with dysmenorrhoea, dyspareunia and low back pain that becomes worse during menstruation²⁷. The fallopian tubes, ovaries and uterine tubes can also present with low back pain when diseased which is unrelated to position or movement^{10,13}. In males, prostatitis often refers pain to the small of the back²⁸ and the pain may be aggravated by activity, possibly leading to an incorrect diagnosis. Sacral pain may also be caused by prostatic cancer²⁹.

The Gastrointestinal Tract may also refer pain to the low back. Duodenal ulcers, particularly of the posterior wall, may refer pain to the upper lumbar^{10,13}, which is associated with burning epigastric pain occurring 1 to 3 hours after a meal, and relieved by food¹⁰. Pancreatic pain is also felt in the upper lumbar and in the midepigastrium and is aggravated by recumbency^{10,13}. Colonic pain may radiate to the low back and is associated with fever and changes in bowel habits¹⁰. It may also radiate to form a belt-like distribution around the body²⁹. Furthermore, a report was made of an anorectal abscess presenting as acute low back pain and sciatica³⁰ due to the close association of structures in this area.

LOW BACK PAIN WITH A PSYCHOLOGICAL OVERLAY

In certain cases the low back pain may have an additional psychological overlay that will prevent conservative treatment from being entirely effective. For instance, patients with a compensation claim for their low back pain tend to have a poorer prognosis than those without a claim^{8,16}. Other causes of psychological overlay include job dissatisfaction, chronic pain or an underlying psychological disorder such as depression, anxiety or somatization^{8,12,16}.

Some signs that a patient may have a psychological overlay to their low back pain include the description of non-anatomical generalised pain and inconsistent test results. Pain drawings can be used to help distinguish between organic and non-organic, or psychological, low back pain as they provide information regarding the patients subjective reaction to their pain¹³. Inconsistent test results include positives that should be functionally impossible such as low back pain caused by compression from the vertex of the head, or conflicting results such as a positive straight leg raise test but a negative slump test. It is also important to note any abnormal or excessive superficial tenderness, non-physiologic weakness, omnipresent symptoms, overuse of narcotics and distractibility or overreaction¹³.

Although the patient may have a psychological overlay to their condition it must be remembered that there is often a true underlying problem initially causing the low back pain. Therefore, these patients need concurrent conservative chiropractic treatment and assessment for any psychological overlay.

CONCLUSION

Chiropractors and osteopaths, as primary care practitioners, need to be aware of the scope of diseases that may present as low back pain. The algorithm presented in this article provides a useful screening tool to distinguish between low back pain amenable to chiropractic treatment and low back pain due to a pathological cause. This categorisation method allows the practitioner to avoid making assumptions based on heuristics and pattern recognition until it has been firmly established that the patient is a candidate for chiropractic care. Once the patient has been placed in the simple mechanical low back pain category, it is then possible for the practitioner to use pattern recognition to arrive at a final diagnosis and treatment protocol.

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